

Liposomes Encapsulating *Aloe vera* Leaf Gel Extract Significantly Enhance Proliferation and Collagen Synthesis in Human Skin Cell Lines

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Abstract :

Aloe vera leaf gel extract (AGE) are widely used as cosmetic and pharmaceutical ingredients because of its versatile skin care properties. In order to enhance the bioavailability of AGE, liposomes encapsulating AGE were prepared and examined for their interfacial and biochemical properties. The liposomes prepared from a soybean lecithin (SLP-WHITE, 1.0 wt%) by the Bangham method gave relatively a good trapping efficiency up to the AGE concentration of 0.5 wt%. The stable liposomes were then prepared from 1.0 wt% of SLP-WHITE and different concentrations of AGE by the mechanochemical method using a homogenizer and microfluidizer. The liposomes obtained from 0.25 wt% of AGE were confirmed to be small unilamellar vesicles with a diameter of less than 200 nm, and remained well dispersed for at least two weeks. The obtained liposomes encapsulating AGE were further examined for the effects on proliferation and type I collagen synthesis in normal human neonatal skin fibroblasts, NB1RGB cells. Liposomal AGE clearly showed higher proliferation rate than that of AGE alone. In addition, compared to the control, liposomal AGE significantly increased the collagen synthesis by 23%, while AGE alone showed a small effect. Liposomal AGE was also assayed for the effect on proliferation in normal human epidermal keratinocytes, NHEK(F) cells. Interestingly, liposomal AGE fractions containing 4 and 20 µg/mL of the extract considerably increased the proliferation rate by 77% and 101%, respectively. In contrast, AGE alone fractions containing 4 and 20 µg/mL of the extract increased the rate by 41% and 60%, respectively. Accordingly, the bioavailability and skin care properties of AGE will be significantly enhanced by liposome encapsulation, and the present liposomal AGE should have a great potential as an effective skin care formulation.

Key words: *Aloe vera*, liposome, bioavailability, skin care, fibroblast proliferation, collagen synthesis, keratinocyte proliferation